REMARKS

At the outset, applicants would like to thank Examiner Kiang and Examiner McIntosh for their time and consideration of the present application at the interview with the undersigned.

Claims 27, 30 and 35 are pending in the present application. Claims 27 and 30 have been amended to recite that the oligosaccharide is a 1,4 β-D-mannuronans of DP 4. New claim 35 has been added. Support for new claim 35 may be found in the present specification at page 3, lines 4-6. Claims 28-29 and 31-33 have been cancelled.

In the outstanding Official Action, claim 33 was rejected under 35 USC §112, second paragraph, as allegedly being indefinite. This rejection is respectfully traversed.

As noted above, claim 33 has been canceled. Thus, applicants believe that the present amendment obviates this rejection.

Claims 27-33 were rejected under 35 USC §102(b) as allegedly being anticipated by ADACHI et al. Claims 27-33 were also rejected under 35 USC §102(b) as allegedly being anticipated by KAISHA. Claims 27-33 were then further rejected under 35 USC §102(b) as allegedly being anticipated by SHIGEMATSU et al. Applicants believe the present amendment obviates these rejections.

The present invention relates to the use of 1,4 β-D-glycuronans compounds of polymerization degree of 4. The present

invention also relates to the use of the oligomers as products enhancing a known biological principle named elicitation. Upon contact of these oligosaccharides with plants, plants activate specific metabolic pathways which modify the cellular medium towards physiological conditions more detrimental to the pest or they can undergo natural metabolic modifications to control development or to enhance resistance to environmental stimuli.

The present invention also relates to the use of the oligomers of 1,4 β-D-mannuronan of polymerization degree of 4, as phytosanitary products, by foliar pulverization. It has been shown that the 1,4 β-D-mannuronan oligomers of average DP 4 amplifies by a factor of 1.3 the enzyme 1,3 β-D-glucanase in *Rubus fruticosus* protoplasts (see Example B, Table 1 of the present application).

Furthermore, the present invention relates to the use of the oligomer 1,4 β-D-mannuronan of polymerization degree of 4 to enhance the adaptation of plant to environmental stimuli. It has been shown that the 1,4 β-D-mannuronan oligomer of polymerization degree of 4, used at nanomolar concentration, in 20 minutes, amplifies, by a factor of 2.12, the xyloglucan endotransglycolase in the protoplasts of *Rubus fruticosus* (see Example D, Figure 1 of the present application).

According to another advantageous embodiment, the present invention relates to the use of the oligomer 1,4 β-D-mannuronan of polymerization degree of 4 to stimulate the 1,4 β-

D-glucanase, one enzyme which is a marker of cell differentiation and particularly of certain development states of the plant like flower formation (see Example C, Table 2 of the present application).

This stands in contrast to the publications cited in the outstanding Official Action.

ADACHI et al. disclose alginic acid oligosaccharides that may be used for treating plants. The oligosaccharides comprise guluronic acid only or mannuronic acid only, having a polymerization degree from 2 to 20, or the combination of guluronic acid and mannuronic acid, having a polymerization degree from 2 to 20.

However, while ADACHI et al. disclose oligosaccharides comprising guluronic acid or mannuronic acid, having a polymerization degree from 2 to 20, ADACHI et al. fail to disclose or suggest the used of the specifically recited oligosaccharide of 1,4 β-D-mannuronan having a polymerization degree of 4.

ADACHI et al. provide a method for cultivating a plant, which comprises using an oligosaccharide exhibiting the action of accelerating the growth of plants; for instance to increase stalk-leaf, root length, stem length of the plant, and to increase weight, or the content of starch.

The molecular basis of the increase in growth relates to hormonal dependence as exhibited in tissues of higher plants,

such as auxins or gibberellins catabolism. Thus, the mechanism of growth is completely different from the pathway involved in defensive reactions against pathogens. Accordingly, an elicitor compound which is active on the plant growth acceleration cannot trigger metabolic pathways involved in defense reactions against pathogens, and inversely.

The claimed invention recites claims the use of the 1,4 β-D-mannuronan oligomers of polymerization degree of 4. These oligomers enhancing, at nanomolar range concentrations, the elicitation process in plants cannot be active indirectly on predators (giraffes) as proposed by the Examiner.

The differences between ADACHI et al and the claimed invention are further demonstrated by the fact that ADACHI et al teaches a composition with an optimal concentrations varying from 0.25% to 0.0025% (micromolar range concentration). The effect of oligosaccharides at micromolar concentrations had also been well confirmed under data reported in Examples 2 to 10. In the present invention, the oligomers are administered for an optimal effectiveness at nanomolar concentrations.

Thus, ADACHI et al. are concerned with a different mechanism and not that the recited oligosaccharide of the claimed invention.

As to SHIGEMATSU et al., the polymerization degrees of the polymers or oligomers (mannuronan and/or guluronan) are not mentioned. However, by taking account of the data reported by

SHIGEMATSU et al., in particular the neutralization degree and viscosity, it is possible to deduce the polymerization degree. The alginates used for protecting plants from viral disease having unknown components exhibiting a neutralization degree of 10 to 30% are polymers or oligomers of high polymerization degree superior or equal to 30. The water soluble alginates having viscosities of 2 to 10 cp are oligomers of polymerization degree superior to 10.

Thus, SHIGEMATSU et al. fail to anticipate or render obvious the claimed invention.

KAISHA et al. disclose mannuronic acid having a polymerization degree from 2 to 20 used in a culture medium of a tissue or cell of a plant to improve the morphogenesis or differentiation frequency in the formation or differentiation of new organ or embryoid body artificial seeds. However, there is no recognition or suggestion to use the specifically recited oligosaccharide of 1,4 β-D-mannuronan having a polymerization degree of 4 as recited in the claimed invention.

Again, this stands in contrast to the present invention. In the present invention, the mode of application is different since the products are used in the whole plants in liquid form by foliar pulverization or in nutritive root solutions for eliciting mechanisms for stimulating the defense reactions against the pathogens or reinforcing the adaptation to the environmental stimuli or controlling the floral development.

As a result, applicants respectfully submit that the above-identified publications fail to anticipate or render obvious

In view of the present amendment and the foregoing remarks, therefore, applicants believe the present application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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